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EXAMINER	
DUDNIKOV, VADIM	

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3663	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,937	BOKOV ET AL.	
	Examiner	Art Unit	
	VADIM DUDNIKOV	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-23* is/are pending in the application.

4a) Of the above claim(s) *18 and 22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-17,19-21 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's 4/29/08 Amendment, which directly amended claims 13-16, 18-21 and 23 and traversed the objection and rejection of the claims in the 11/29/07 Office action are acknowledged.

Specification amendments are overcome the Specification objection in the 11/29/07 Office action and said objection is withdrawn.

Claim amendments do not overcome the claim rejection under 35 U.S.C 112 in the 11/29/07 Office action and said rejections are still valid.

Response to Arguments

2. Applicant's arguments see pages 7-11 filed 4/29/2008 have been considered but they are not in every respect persuasive. Those rejections and objections that have been overcome by arguments are omitted from the current Office Action and are to be considered withdrawn.

Applicant's traverse of Election/Restriction is not persuasive because:

1) The Species I and II do not related to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, **they lack the same or corresponding special technical features** for the following reasons: the general inventive concept set

forth, for example, in claims such as claim 18, does not define over the teachings of the prior art set forth, for example, in Krakowski ("Accelerator transmutation of Waste Economics, Nucler Technology 110 (1995)) and over Kadi et al., (Design of accelerator-driven system for the destruction of nuclear waste", LNS0212002, lecture given at 3 September 2001) in view of Knief ("Nuclear Engineering), Hemisphere Publishing Corporation, 1992). The special technical feature of species I (claims 16, 17, 21, 22) is a neutron generation by high energy proton beam, while the special technical feature of species II (claim 18) is a neutron generation by high energy electron beam. Since the special technical feature of species I is not present in the claims drawn to species II, and the special technical feature of species II is not present in the claims drawn to species I, unity of invention is lacking.

2) If species I is elected applicant is further required under PCT Rule 13.1 to elect one of the following subspecies for spallation targets.

The subspecies are as follows:

- Subspecies A: spallation target with buffer (claim 22);
- Subspecies B: Spallation target without buffer (claim 21).

The special technical feature of subspecies A is a spallation target with buffer for suppression neutron generations by high energy beam , while the special technical feature of species B is a spallation target without buffer. Since the special technical feature of species A is not present in the claims drawn to species B, and the special technical feature of species B is not present in the claims drawn to species A, unity of invention is lacking.

By these reasons the request for Election/Restriction is proper and election made FINAL. Claims 18 and 22 are withdrawn from consideration as non-elected. Claim 13-17, 9-21 and 23 have been examined.

3. Applicant traversed the rejection under U.S.C. § 103 (a) as allegedly obvious over Kadi et al., (Design of accelerator-driven system for the destruction of nuclear waste", LNS0212002, lecture given at 3 September 2001) in view of Knief ("Nuclear Engineering), Hemisphere Publishing Corporation, 1992).

on the grounds that:

a) *Applicant requests reconsideration of this rejection. In particular, neither Kadi et al., Knief nor their combination disclose or suggest: "adjusting the number of external neutrons depending on operating fluctuations of the nuclear reactor power by acting on the energy of the charged particles, (Ep) generated and accelerated by the accelerator, wherein the accelerator is configured to be controlled by the particle energy with a constant beam intensity."*

b) *Furthermore, the reason for combining Knief with Kadi et al. is not based on substantial evidence. Instead, it is a conclusory statement made with hindsight gained from the subject invention. As described above, Knief and Kadi et al. describe completely different systems, one which needs an external neutron source and one which does not, one which requires control of internal neutron generation to prevent runaway reactions and one which does not. Furthermore, Kadi et al. teach that it is undesirable to control the energy of the charged particles to adjust the number of*

external neutrons, as required by claims 1 and 19 of the subject invention, because Kadi et al. teach that the energy of the charged particles should be above about 1GeV to ensure energy gain stability. If Kadi et al. were to control the energy of the charged particles, they would lose this energy gain stability. Finally, at page 100, Kadi et al. teach that their ADS "provides a decoupling of the neutron source ... from the fissile fuel ...."

This decoupling would be lost if Kadi et al. were combined with Knief as proposed in the Office Action.

Examiner disagrees.

As to arguments a) Kadi reference discloses in Fig. 15 "adjusting the number of external neutrons by acting on the energy of the charged particles, (Ep) generated and accelerated by the accelerator" and Knief discloses in Fig. 5-3 a feedback regulation for stabilization of a core power opposite all factors including depending on "operating fluctuations of the nuclear reactor power".

The recitation that an element is "configured to" perform a function is not a positive limitation but only requires the ability to perform, i.e., it does not constitute a limitation in any patentable sense (see *In re Hutchison,* 69 USPQ 138). The systems disclosed by Kadi are capable to operate with a variable energy and constant current as was demonstrated in Fig. 15. Graphs in Fig. 15 are showing a weak dependence of neutron gain from energy above 1 GeV.

According to MPEP § 7.37.10 Unpersuasive Argument: Limitation(s) in Preamble:

In response to applicant's arguments, the recitation "of controlling an accelerator coupled nuclear system (ACS) comprising a nuclear reactor having a core, the nuclear reactor, operating in sub-critical mode, and an external neutron generator device using a beam of accelerated charged particles, the external neutron device generator consuming a predetermined fraction of energy f^{nom} produced by the core in order to produce a number of external neutrons for maintaining a nuclear chain reaction in the core, and an operating point of the system being selected at a nominal charged particle energy E_p^{nom} close to an optimal energy E_p^{max} for which a ratio between the number of external neutrons produced and an energy of a beam of the charged particles used by the external neutron generator device to produce the external neutrons is maximum" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

As to arguments b) Knief discloses in Fig. 5-3 an universal feedback regulation for integrated dynamic responses stabilization of a core power opposite all factors including depending on "operating fluctuations of the nuclear reactor power" with using all variable parameters including a rate of neutron generation by internal neutron source used in ordinary nuclear reactor or by an external neutron source disclosed by Kadi.

Other Arguments are relating to amendment claim language rather than rejected claim language because: "The claims have been amended to correct this misperception. Basis for this amendment may be found in paragraph [0062] and in particular, equation 4".

There are no reason for claim allowance.

4. The claims rejections in the previous Office Action under 35 U.S.S. 103 are proper and still proper for amended claims.

Claims 13-17, 19-21 and 23 are unpatentable on the steps structure over the structure found in the prior art. Rejections of amended claims are established in light of further consideration and search of the prior Art. See rejections underneath.

Claims 13-17, 19-21 and 23 have been examined.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 13-17, 19-21 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are indefinite because formulas used for claims limitation discloses are valid or can be used in a

relative narrow area of parameters variations and these areas of allowable parameters variation are not determined in application. Particularly, a predetermined fraction of energy f^{nom} (used in independent claim 1) cannot be predetermined or finite for some modes of system operation because a relative high power is needed for accelerator operation support without particle beam generation. By this reason parameter f^{nom} cannot be "predetermined".

A predetermined amount of energy f^{nom} (used in independent claim 19) cannot be constant or finite for some modes of system operation because a relative high power is needed for accelerator operation support without particle beam generation. By this reason parameter f^{nom} cannot be "predetermined".

Value of "the negative fluctuations of the power of the reactor in the normal operating mode of the reactor" recited in claims 14 and 20 is not determined in application.

By the above reasons the limitation as quoted above as it occurs in the claims 13 and 19 is indefinite.

Claims 14-17, 20-21 and 23 are rejected as dependent on claims 13 and 19.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 13-17, 19-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadi et al., (Design of accelerator-driven system for the destruction of nuclear waste", LNS0212002, lecture given at 3 September 2001, Kadi hereinafter, cited before) in view of Knief ("Nuclear Engineering), Hemisphere Publishing Corporation, 1992, cited before).

As can be best understood in the presence of the indefiniteness under 35 U.S.C. 112, second paragraph, detailed above, regarding the claim **13**, Kadi et al., (assuming that the "level of subcriticality" is as disclosed by Kadi et al. on page 100, lines 6+) disclose: a method of controlling an accelerator coupled nuclear system (ACS) (page 91, lines 26+, Fig. 3) comprising a nuclear reactor having a core (Fig. 3, Fig. 16page 110, lines 1+), the nuclear reactor, operating in sub-critical mode (page 87, lines 8+), and an external neutron generator device using a beam of accelerated charged particles (Fig.

3, page 92,lines 1+), the external neutron device generator consuming a predetermined fraction of energy fnom f^{nom} produced by the core in order to produce a number of external neutrons for maintaining a nuclear chain reaction in the core ("f" in Fig. 3, page 92, lines 1+), and an operating point of the system being selected at a nominal charged particle energy E_p^{nom} close to an optimal energy E_p^{max} for which a ratio between the number of external neutrons produced and an energy of a beam of the charged particles used by the external neutron generator device to produce the external neutrons is maximum (Fig. 15, pages 108-109,), the method comprising the steps of: for a self-regulated and reliable operation of the coupled system selecting the nominal charged particle energy E_p^{nom} to be greater than the optimal energy E_p^{max} (operation points with proton kinetic energy above 1 GeV in Fig. 15), and adjusting the number of external neutrons by acting on the energy of the charged particles (E_p) generated and accelerated by the accelerator (as shown in Fig. 15; operation of sub-critical reactor with accelerator driving external neutron source with different energies of particle accelerator).

Kadi et al., do not necessary teach directly the limitation "adjusting the number of external neutrons depending on operating fluctuations of the nuclear reactor power". However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Knief drawn to the theory and technology of commercial nuclear power feedback regulation, hence analogous art, who teach the reactor reactivity monitoring and feedback controlling of neutron flux density (page 152, lines 13+; Figure 5-3, page153, lines 1+). Neutron flux detectors are

used for power monitoring in core (page 266, lines 44+, page 267, lines 1+). Recalculated signals from said detectors are used for feedback control of the neutron generation (Fig. 5-3, page 152, lines 34+). It is obvious for one of ordinary skill in the art to use said signal for the neutron generation control through the control of accelerator parameters because said feed back used for stabilization of neutron flux density.

The recitation that an element is "configured to" perform a function is not a positive limitation but only requires the ability to perform, i.e., it does not constitute a limitation in any patentable sense (see *In re Hutchison,* 69 USPQ 138). The systems disclosed by Kadi are capable to operate with a variable energy and constant current as was demonstrated in Fig. 15. Graphs in Fig. 15 are showing a weak dependence of neutron gain from energy above 1 GeV.

Motivation for said inclusion derives from Kadi et al., who teach: "The accelerator provides a control mechanism for sub-critical systems, which is by far more convenient than control rods in critical reactors", (page 100, lines 24+).

According to MPEP § 7.37.10 the recitation in claim 13 "of controlling an accelerator coupled nuclear system (ACS) comprising a nuclear reactor having a core, the nuclear reactor, operating in sub-critical mode, and an external neutron generator device using a beam of accelerated charged particles, the external neutron device generator consuming a predetermined fraction of energy fnom f^{nom} produced by the core in order to produce a number of external neutrons for maintaining a nuclear chain reaction in the core, and an operating point of the system being selected at a nominal charged particle energy E_p^{nom} close to an optimal energy E_p^{max} for which a ratio between the number of

external neutrons produced and an energy of a beam of the charged particles used by the external neutron generator device to produce the external neutrons is maximum" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

On claim **14**, Kadi et al. teach: the operating point of the system is determined by the nominal charged particle energy E_p^{nom} being equal to a sum of the optimal energy E_p^{max} and an energy ΔE_p, selected so as to be greater than possible negative fluctuations of the charged particle energy in response to negative fluctuations of the power of the nuclear reactor in the normal operating mode of the nuclear reactor (as shown in Fig. 15; operation of sub-critical reactor with accelerator driving external neutron source with different energies of particle accelerator).

On claim **15**, Kadi et al. disclose limitation of claim 15: Method of controlling an accelerator coupled nuclear system (ACS) in accordance with claim 13, comprising the following steps:

1. determining operating conditions under which the nuclear reactor is to be operated the operating conditions consisting of: level of sub-criticality (r_0) (page 100, lines 6+), consumable power ((1-f) in Fig. 3; the fission power extracted; page 87, lines 8+), quantity of fuel and kind of fuel, wherein consumable power is selected from a group consisting of thermal power P_{th} or electric power $P_{el} = \eta_{el}P_{th}$ where η_{el} is the electric yield of the plant, (the fission power extracted; page 87, lines 8+; Fig. 16, page 110, lines 1+),
2. from the determined operating conditions, determining operating parameters of the accelerator as follows:

a - determining the optimal energy E_p^{max} of the charged particles, which verifies the expression:

$d/dE_p, [\varphi^*(E_p)\eta_a(E_p)Y_n(E_p)/E_p] = 0$

in which E_p is the energy of the charged particles, Y_n is the neutron yield, φ^* is the neutron importance (determined on page 1003, lines 15+), and η_a is the yield of the accelerator, (this limitation is well known, standard procedure for determination of function maximum included in devices for measurement of function or simulate functions as shown in Fig. 15, page 109, lines 1+),

b - selecting an operating nominal charged particle energy E_p^{nom} to be equal to or greater than the optimal

energy E_p^{max}:

$E_p^{nom} = E_p^{max} + \Delta E_p$, $\Delta E_p > 0$. (2).

(operation with this nominal energy is shown in Fig. 15; operating point with energy above 1 GeV),

c - determining a nominal intensity I_p^{nom} of the beam of charged particles necessary to obtain a nominal power of the reactor P_{th}^{nom} depending on the nominal charged particle energy E_p^{nom}, on the neutron yield $Y_n(E_p^{nom})$, on the yield of the accelerator η_a (E_p^{nom}), on the average number v of fission neutrons, on the energy E_{fis} supplied in a fission reaction, and on the neutron importance $\varphi^*(E_p^{nom})$ for the nominal charged particle energy E_p^{nom} according to the equation:

$I_p^{nom} = r_0 v P_{th}^{nom}/[E_{fis}\ \varphi^*(E_p n^{nom})\ Y_n(E_p^{nom})]$, (3)

as well as the fraction of power produced by the reactor that is consumed by the accelerator according to the equation:

$f^{nom} = E_p^{nom} r_0 v/[E_{fis}\ \varphi^*(E_p^{nom})\ Y(E_p^{nom})\ \eta_a(E_p^{nom})\ \eta_{el}\ ]$, (4);

(as shown in Fig. 87, lines 8+).

3. setting the fraction of the power produced by the reactor that can be consumed by the accelerator as a fraction f of the total power produced by the reactor, as well as the intensity of the charged particle beam at nominal values I_p^{nom} and f^{nom} according to the following formulas:

$I_p^{nom} = r_0 v P_{th}^{nom}/[E_{fis}\ \varphi^*\ (E_p n^{nom}) Y_n(E_p^{nom})]$, (3)

$f^{nom} = E_p^{nom} r_0 v/[E_{fis}\ \varphi^*\ (E_p^{nom}) Y(E_p^{nom})\ \eta_a\ (E_p^{nom})\ \eta_{el}\ ]$, (4);

(as shown in Fig. 3, page 92, lines 1+),

4. adjusting the number of external neutrons acting on the particle energy Ep with constant beam intensity, depending on the operating fluctuations of the nuclear reactor power, according to an expression that defines the variation of the energy:

$E, = f^{nom} P_{el}\, \eta_a(E_p)/I_p^{nom}$ (5);

(as shown in Fig. 15, page 108, lines 1+).

On claim **16**, Kadi et al. disclose: the charged particles are protons, and the neutron-generating nuclear reaction is a spallation reaction(proton kinetic energy in Fig. 15, page 109, lines 3+; page 92, 4.1 The Spallation process; Fig. 4; Fig. 6, 7, page 95, lines 6+).

On claim **17**, Kadi et al. disclose: the spallation target is made of lead-bismuth, and the optimal proton energy E_p^{Max} ranges from 0.5 GeV to 2.5 GeV (section 4.1 "The Spallation process", page 92-100; Fig. 6, 7).

As can be best understood in the presence of the indefiniteness under 35 U.S.C. 112, second paragraph, detailed above, regarding the claim **19**, Kadi et al., (assuming that the "level of sub-criticality" is as disclosed by Kadi et al. on page 100, lines 6+) disclose: Accelerator coupled nuclear system (page 91, lines 26+, Fig. 3) comprising a nuclear reactor, having a core (Fig. 3, Fig. 16page 110, lines 1+), operating in subcritical mode (as shown in Fig. 3, page 91, lines 26+) and an external neutron generator device using

a beam of accelerated charged particles (in Fig. 3, page 92, lines 1+), the external neutron generator device consuming a predetermined amount of energy f^{nom} produced by the core in order to produce a number of external neutrons for maintaining a nuclear chain reaction in the core (f in Fig. 3), and an operating point of the system being selected at a nominal charged particle energy E_p^{nom} close to an optimal energy E_p^{max} for which a ratio between the number of external neutrons produced and an energy of the charged particle beam used to produce the external neutrons is maximum (Fig. 15, page 108, lines1+; page 109, lines 1+), wherein, for a self- regulated and reliable operation, the nominal charged particle energy E_p^{nom} is selected so as to be greater than the optimal energy E_p^{max} (said means is procedure for determination of maximum of function existing in a standard equipment for measurement and simulation of a system operation parameters used for system design and operation as shown in Fig. 15, in Figs. 6, 7; pages 92-111), and, the system comprising means for acting on the energy (E_p) of the charges particles generated and accelerated by the accelerator for adjusting the number of external neutrons by acting on (E_p), the energy of the charged particles generated and accelerated by the accelerator (operation points with proton kinetic energy above 1 GeV in Fig. 15; as shown in Fig. 15; operation of sub-critical reactor with accelerator driving external neutron source with different energies of particle accelerator).

Kadi et al., do not necessary teach directly the limitation "adjusting the number of external neutrons depending on operating fluctuations of the nuclear reactor power".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Knief drawn to the theory and technology of commercial nuclear power and reactor operation stabilization, hence analogous art, who teach the reactor reactivity monitoring and feedback controlling of neutron flux density (page 152, lines 13+; Figure 5-3, page153, lines 1+). Neutron flux detectors are used for power monitoring in core (page 266, lines 44+, page 267, lines 1+). Recalculated signals from said detectors are used for feedback control of the neutron generation (Fig. 5-3, page 152, lines 34+). It is obvious for one of ordinary skill in the art to use said signal for the neutron generation control through the control of accelerator parameters because said feed back used for stabilization of neutron flux density.

Motivation for said inclusion derives from Kadi et al., who teach: "The accelerator provides a control mechanism for sub-critical systems, which is by far more convenient than control rods in critical reactors", (page 100, lines 24+). According to MPEP § 2111-2115, particularly MPEP § 2114, which states the recitations in claim 19 "operating in subcritical mode", "using a beam of accelerated charged particles", "consuming a predetermined amount of energy f^{nom} produced by the core in order to produce a number of external neutrons for maintaining a nuclear chain reaction in the core", "being selected at a nominal charged particle energy E_p^{nom} close to an optimal energy E_p^{max} for which a ratio between the number of external neutrons produced and an energy of the charged particle beam used to produce the external neutrons is maximum", "for a self- regulated and reliable

operation, the nominal charged particle energy E_p^{nom} is selected so as to be greater than the optimal energy E_p^{max} ", "for acting on the energy (E_p) of the charges particles generated and accelerated by the accelerator for adjusting the number of external neutrons by acting on (E_p), the energy of the charged particles generated and accelerated by the accelerator" represent of the intended use of the components of accelerator coupled nuclear system. Note that a method limitation or recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See MPEP § 2111-2115, particularly MPEP § 2114, which states:

"A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim." *Ex parte Masham*, 2 USPQ2d 1647.

"Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function." *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531.

"[A]pparatus claims cover what a device is, not what a device does." *Hewlett-Packard_Co. v. Bausch & Lomb Inc.* 15 USPQ2d 1525, 1528.

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

On claim **20**, Kadi teaches: means (interpreted as an equipment for measurement and simulation of neutron generation and for processing these data) for determining the operating point of the system by the nominal charged particle energy E_p^{nom} being equal to a sum of the optimal energy E_p^{max} and an energy ΔE_p, selected so as to be greater than possible negative fluctuations of the charged particle energy in response to the negative fluctuations of the power of the reactor in the normal operating mode of the reactor (said means is procedure for determination of maximum of function existing in a standard equipment for measurement and simulation of a system operation parameters used for system design and operation as shown in Fig. 15, in Figs. 6, 7; pages 92-111; as shown in Fig. 15; operation of sub-critical reactor with accelerator driving external neutron source with different energies of particle accelerator).

On claim **21**, Kadi et al. teach: the charged particles are protons directed in a beam at a central part of the core, and the core comprises a spallation target (as shown in Fig. 3; Fig. 16; proton kinetic energy in Fig. 15, page 109, lines 3+; page 92, 4.1 The Spallation process; Fig. 4; Fig. 6, 7, page 95, lines 6+).

On claim **23**, Kadi et al. teach: a target for producing the neutrons in response to the charged particles, the target having an optimized geometry which increases losses of the charged particles in this target (as shown in Fig. 3; Fig. 16; proton kinetic energy in

Fig. 15, page 109, lines 3+; page 92, 4.1 “The Spallation process” target optimization; Fig. 4; Fig. 6, 7, page 95, lines 6+).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VD. 8/2/08

/Rick Palabrica/

Primary Examiner, Art Unit 3663